TA 16

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

CINDY PADILLA
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 15, 2007

David Gregory
Federal Project Director
Los Alamos Site Office, Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

David McInroy
Remediation Services Deputy Project Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop M992
Los Alamos, NM 87545

RE: NOTICE OF DISAPPROVAL OF THE EVALUATION OF THE SUITABILITY OF WELLS NEAR TECHNICAL AREA 16 FOR MONITORING CONTAMINANT RELEASES FROM CONSOLIDATED UNIT 16-021(C)-99
EPA ID #NM0890010515

Dear Messrs. Gregory and McInroy:

The New Mexico Environment Department (NMED) is in receipt of the Department of Energy and Los Alamos National Security, LLC (collectively, the Permittees) document entitled "Evaluation of the Suitability of Wells Near Technical Area 16 for Monitoring Contaminant Releases from Consolidated Unit 16-021(c)-99" (Evaluation) dated April 2007 and referenced by LA-UR-07-2370 and EP2007-0135. NMED hereby issues this Notice of Disapproval (NOD) and provides the following comments:

General Comments:

NMED continues to question the suitability of the current groundwater monitoring network surrounding Technical Area (TA) 16 to address the needs for monitoring potential contaminant releases from Consolidated Unit 16-021(c)-99. A well-designed groundwater monitoring network should be capable of intercepting the centerline of a plume, (i.e., the zone likely to contain the highest concentration of contaminants), as early as possible once contaminants reach the regional aquifer. The numerical modeling efforts described in the Evaluation assumed contaminant breakthrough from two areas: below Cañon de Valle and Martin Spring Canyon. With this assumption, two separate contamination plumes in the regional groundwater were indicated. Monte Carlo simulations were conducted in the Evaluation, attempting to quantitatively address uncertainties of contaminant fate and transport resulting from aquifer heterogeneities. NMED has identified the following issues related to the simulations:

a) Based on the modeling simulations, the Permittees concluded that R-17, R-18, R-19, CdV-R-15-3, CdV-R-37-2 and R-27 are important groundwater monitoring wells for detecting the two plumes originating, respectively, below Cañon de Valle and Martin Spring Canyon. The Permittees further claim that the saturated-zone analyses were computationally very intensive and produce a large volume of output results. However, the Permittees did not include statistical analyses of the Monte Carlo simulation results, hence NMED was provided little information that quantifies the probability of each well or group of wells to capture the plumes or releases from the identified potential sources.

b) Figure 4.3-4 shows that CdV-R-15-3, CdV-R-37-2 and R-19 are located either outside or near the boundary of the calculated flow lines that bound the Monte Carlo simulations. It is less likely that any well located near the boundary flow lines will be likely to detect contamination from any potential plume(s). If natural attenuation processes, such as degradation, are considered in the fate and transport model, the zone encompassed by the 2000 simulations may be narrower and shorter than the plumes illustrated in Figure 4.3-4. This implies that there would be an even lower probability for CdV-R-15-3, CdV-R-37-2 and R-19 to detect the plumes. Furthermore, considering that the designed groundwater monitoring network is likely to be used in the future for compliance purposes to monitor the effectiveness of a remedy to be implemented at the site, these three wells, due to their proximity to the boundary of the flow lines, are even less likely to detect contaminants that escape containment from an inefficient or malfunctioning remedial system.

c) According to Figure 4.3-4 in the Evaluation, although R-17 and R-27 appear likely to intercept the centerline of each plume, they are located far downgradient of the contaminant infiltration zones. Contaminant plumes that originate below Cañon de Valle and Martin Spring Canyon may not be detected by R-17 and R-27 until the contaminants spread in groundwater as far as 3 to 5 miles downgradient from the assumed zone of contact with the water table. Creating such a large plume in the regional aquifer not only does not protect human health and the environment, but also will result in a more time-consuming and costly remedial action for the Permittees. Neither R-17 nor R-27 can be used to effectively detect new releases of contaminants from TA-16, or demonstrate the effectiveness of the remedy selected for the site.

In order to demonstrate that the current monitoring wells have a high degree of confidence to rapidly detect the two plumes that are shown in Figure 4.3-4, the Permittees must therefore conduct a comprehensive statistical analysis of the Monte Carlo simulation results. Specifically, the Permittees must calculate the probability of each well, including but not limited to, R-18, R-17, R-19, CdV-R-15-3, CdV-R-37-2 and R-27, to capture the contamination plumes created from contaminant breakthrough in Cañon de Valle and Martin Spring Canyon. If the probability of these wells to intercept the two modeled plumes is not 95% or greater, the Permittees must identify locations for new wells to satisfy both remedy selection and compliance monitoring purposes. The Permittees must propose a groundwater monitoring network capable of detecting contaminant releases within a reasonable timeframe following their contact with the regional groundwater table (see the presentation in the "Mortandad Canyon Groundwater Monitoring Well Network Evaluation dated June 2007 and referenced by LA-UR-07-4343 and EP2007-0386), such as six months.

Specific Comments:

1. Section 2.2.1.4, Deep Perched and Regional Aquifers, p. 9
The Permittees state that "[d]own gradient wells...have occasional detections of organic and inorganic constituents at levels greater than detection limits and background values but do not show consistent detections of HE (with the possible exception of R-18), as would be expected if the TA-16 HE plume had reached these wells." Although this statement is plausible, other explanations for the sporadic detections of inorganic constituents in R-18 exist. For example, pathways to the regional aquifer are likely to be limited to fracture flow and spatially variable. Historical discharges and less variable saturation would have created a mechanism for contaminants to be transported to the subsurface. Since the volume of releases from outfalls at TA-16 has significantly diminished, contaminants (sources) that exist beneath canyon bottoms may now be mobile only during recharge events; this would explain the sporadic detections of various constituents. This alternative hypothesis is supported by data and conclusions provided in the Evaluation (see Table 4.2-4, p. 113 of the Evaluation). In addition, the contaminants detected are not unexpected given the processes and release history at TA-16.

2. Section 2.2.2 Nature and Extent of Contamination, p. 10

The Permittees indicate that subsurface contamination is primarily limited to an area below the pond, based on analytical results from samples collected from intermediate-depth boreholes adjacent to the Outfall that contain no contamination in subsurface intervals. While this might be a compelling argument in areas where contaminant transport is dominated by matrix flow, fracture flow is likely to be a major vertical transport flow mechanism in this area. Consequently, these findings would not be unexpected unless the area of infiltration was intercepted during drilling.

3. Section 3.3, Contaminants of Concern for 260 Outfall, p. 16

The relevance of the prioritization of the contaminants of potential concern (COPCs) is not clear. If a contaminant is detected, or was detected in previous sampling events, from any phase of the investigation or corrective measures study, that contaminant must be carried forward unless approved by the NMED to remove from consideration. The Permittees must provide clarification regarding the usefulness of the prioritization or remove the references from the text and relevant tables (e.g., Table 3.3-1b, Identification of relevant organic COPCs).

4. Section 3.3, Contaminants of Concern for 260 Outfall, p.17

The category "COPCs Impacted by Category B" states that "[n]one of the COPCs listed in Table 3.3-1a would be impacted by this category of drilling effects." Table 6.0-1 appears to contradict this statement. The Table seems to indicate that several screens at R-19 and R-25 cannot yield a reliable and representative sample for both barium and manganese. The Permittees must clarify this and correct any associated errors in the Evaluation.

5. Section 3.4, COPCs Impacted by Category F, p. 19

This section indicates that about 70% of well screens assessed for groundwater monitoring purposes in this report are capable of yielding "reliable and representative" data for RDX, barium, other high explosive compounds, and semi-volatile, and volatile organic compounds. Currently, the Evaluation only proposes to replace one well (R-25 - screen 1) and rehabilitate one screen in CdV-R-37-2. Depending on the COPC, as many as ten available screens were identified as being incapable of providing reliable and representative groundwater monitoring data. The Permittees must provide rationale for not selecting other available screens for rehabilitation or replacement, and include a proposal for replacement or rehabilitation of additional well screens in the revised Evaluation.

6. Section 3.4, Summary of Potential Impacts to the Monitoring Network, p. 21

Bullet #2 indicates that one possible factor that makes assessment of the wells difficult is that the well screens and filter packs may provide a "conduit for groundwater flow and transport." The Permittees must provide a process outlining how this complicating factor will be assessed for each of the candidate wells and how the wells will be remedied if necessary. Any well located in a good location for monitoring groundwater identified as having this problem, but that cannot be remedied within 90 days, must be replaced.

7. Section 4.1.1 Alternative Conceptual Models for the Pajarito Plateau, p. 23

The Permittees cite internal studies to support the various conceptual models. Peer reviewed professional journal articles provide rationale to support conceptual models and the conclusions and recommendations therein. The Permittees should attempt to use peer-reviewed journal articles whenever possible to develop more credible conclusions and recommendations.

8. Section 6.0, Recommendations for Improving the Monitoring Network, p. 41

Overall, 18 of 26 screens (69.2%) pass the evaluation to for reliable and representative samples. However, the recommendations outlined in the Evaluation only include plugging and abandoning one well (CdV16-2(i)), deepening one borehole (CdV-16-3(i)), rehabilitating screen 2 in CdV-R-37-2, and adding a new well to replace screen 1 in R-25. Although the Well Evaluation indicates "a high level of confidence" that plumes originating at TA-16 will be detected, the report seems to "grade" the available monitoring network less than reliable overall.

The Permittee's recommendations for R-25 only include replacing one screen. Because the screen is unusable due to construction problems, at least one additional well or well screen must be added to monitor the zone in the region where the highest concentrations of high explosive compounds have been observed, between 1055 and 1065' bgs (screen #3).

For example, screens 1 through 3 in CdV-R-15-3 are unusable; screens 4, 5, and 6 appear to have bentonite adjacent to the screened intervals. Monitoring screens 1 through 3, located near the top of the regional aquifer, will be essential if the conceptual model for the regional aquifer is an accurate depiction (i.e., layered, with little hydraulic connection between the upper and deep portions of the aquifer). The Permittees must propose new wells to replace and monitor the same or similar zones, or provide remedies to alleviate the problems associated with the screens in this well. Based on predicted flow paths, detection monitoring at this location appears to be necessary.

Several deep zones in monitoring wells R-19, CdV-R-37-2 and CdV-R-15-3 are incapable of yielding reliable and representative groundwater samples for barium, RDX, and other explosive constituents. As illustrated by the modeled groundwater flow paths, these wells and screened intervals are also necessary for detection monitoring purposes because they are within the modeled flow paths. Should vertical transport of contaminants occur, replacement wells for these intervals are needed to detect contaminants. As an aside, the Permittees must include all known high explosive compound degradation products in the Evaluation as well.

Finally, this section indicates that after approval of the proposed actions, the "well drilling/rehabilitation efforts will be completed by the end of fiscal year 2008 (October 1, 2008), (Assuming funding is available)." NMED agrees with the proposed completion date of October 1, 2008, and requires the Permittees to comply with it.

Additional recommendations for screen/well rehabilitation and new well installation based on these comments should be reflected in the upcoming 16-021(c) CME report due August 31, 2007. Any additional requirements, including schedule, will be addressed with the approval of the CME Report. A revised Well Evaluation, incorporating all required information must be submitted to the NMED no later than September 30, 2007. Should you have any questions or comments, please contact Hai Shen at (505) 476-6038.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
D. Goering, NMED HWB
H. Shen, NMED HWB
J. Young, NMED HWB
T. Skibitski, NMED DOE OB
S. Yanicak, NMED DOE OB, MS J993
B. Olson, NMED GWQB
L. King, EPA 6PD-N
M. Johansen, DOE LASO, MS A316
D. Katzman, LANL ENV ECR MS J992
C. Mangeng, LANL ENV MS J591
J. Dewart, LANL ENV MS M992

file: Reading and LANL TA-16 [16-021(c)-99, Groundwater]